SHEng

SMART HEALTHCARE ENGINEERING

IT Infrastructure of Hospital

Part 1

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Engineers

- No matter what branch of engineering we are from
- We are the problem solvers
- A lot of works to do for this scope and subject.

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Success

Manage risks not crisis

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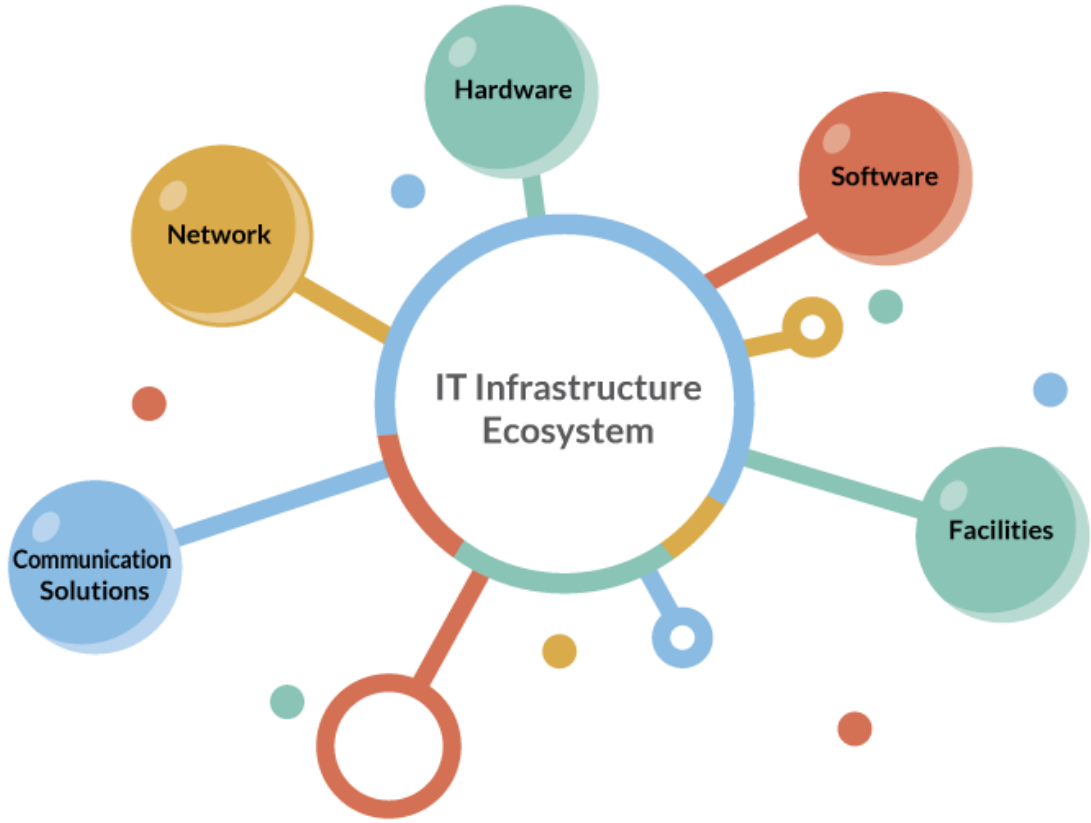
CONTENT

- Information
- IT Responsibilities (Subunits)
- Hospital Information Management System (HIMS)
  - Benefits
  - Elements
- Hospital Data Center Management, Backup, and Business Continuity
- Alerts and Notifications
- Server Structure and Network Architecture
- Data Security and Backup
- Integration

INFORMATION

- In a hospital we produce, process, store, serve and protect information.
- Information is everywhere in the hospital.
- Effective use of IT in a hospital increases the quality of care, operational efficiency, and overall patient outcomes.



PROCESS INTERACTION RATING TABLE

MAIN PROCESS	SUB PROCESES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
CORPORATE SERVICES	1.Organisational Structure	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	2.Quality Management	C	A	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	3.Risk Managemenet	c	C	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	B	B	B	C	B	B	B
	4.Social Responsibility	C	B	B	A	A	B	A	A	C	C	C	C	C	C	C	A	A	A	A	B	B	A	B	A	A	A	A	A	B
PATIENT and STAFF FOCUSED SERVICES	5.Human Resources	c	c	B	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C
	6.End of Life Services	C	B	B	B	B	A	B	B	C	C	C	C	B	C	C	C	C	A	A	A	A	C	B	C	B	B	B	A	A
	7.Patient Rights	c	B	B	A	A	A	A	B	C	C	C	C	C	C	C	C	C	A	B	C	C	A	B	B	B	A	A	A	C
	8.Staff Rights and Safety	C	C	C	B	C	A	B	A	B	B	B	B	B	B	B	A	B	B	B	B	B	B	B	A	B	B	B	B	B
HEALTHCARE SERVICES	9.Inpatient	c	B	B	B	C	C	C	C	A	C	C	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C
	10.Outpatient	C	B	B	C	C	A	A	C	C	A	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	B	B	C
	11.Emergency Patient	C	B	C	B	B	C	C	C	C	C	A	C	B	B	C	C	C	C	C	C	C	C	C	B	C	C	C	A	B
	12.Maternity Services	C	B	B	B	B	B	B	B	C	C	C	A	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	13.Psychiatry	C	B	C	C	B	B	C	C	C	C	C	C	A	B	C	C	B	B	B	C	C	C	C	C	C	C	C	A	C
	14.Dialysis	C	B	B	B	B	B	B	B	C	C	C	B	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	15.Intensive Care	C	B	C	B	C	C	B	B	C	B	C	B	B	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	16.Pharmacy	C	B	B	A	B	B	C	C	C	B	C	C	C	C	C	A	C	A	B	C	B	C	C	A	C	C	C	C	C
	17.Operation Rooms	C	B	B	B	C	C	C	C	C	A	C	C	B	B	C	C	A	C	C	C	C	C	C	B	C	C	C	C	C
	18.Sterilization	C	B	B	A	C	B	B	C	C	C	C	C	C	C	C	A	C	A	A	A	A	C	C	B	C	C	C	B	C
	19.Transfusion	C	B	C	A	A	A	B	C	C	C	C	C	C	C	C	A	C	A	A	B	C	B	C	A	C	C	C	C	A
	20.Radiology	C	B	B	A	B	A	B	C	C	C	C	C	C	C	C	B	C	B	A	A	B	C	C	A	C	C	B	C	C
	21.Laboratories	C	B	B	A	B	A	B	C	C	C	C	C	C	C	C	A	C	A	C	A	A	C	C	B	B	C	C	C	C
SUPPORT SERVICES	22.Facility Management	C	B	C	A	B	B	A	B	B	B	B	B	B	B	B	B	C	B	B	B	B	A	C	B	C	B	B	C	C
	23.INFORMATION MANAGEMENT	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C
	24.Archieve	C	B	B	A	A	B	B	B	C	A	A	C	C	A	C	B	B	A	B	A	B	A	C	A	A	A	A	A	A
	25. SCM	C	B	B	A	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	B	C
	26.Clinical Engineering	C	B	B	A	A	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A	B	C	A
	27.Waste Management	C	B	B	A	C	A	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C	B	C	A	C	C
	28.Outsourcing	C	B	B	A	B	A	A	A	C	C	C	C	C	C	C	B	C	B	C	C	C	B	C	A	A	B	C	A	C
	29.Accommodation Services	C	B	B	C	A	B	C	C	c	C	C	C	C	C	C	C	A	C	C	A	B	C	B	A	C	A	C	C	A
		AFFECTED																												AFFECTING

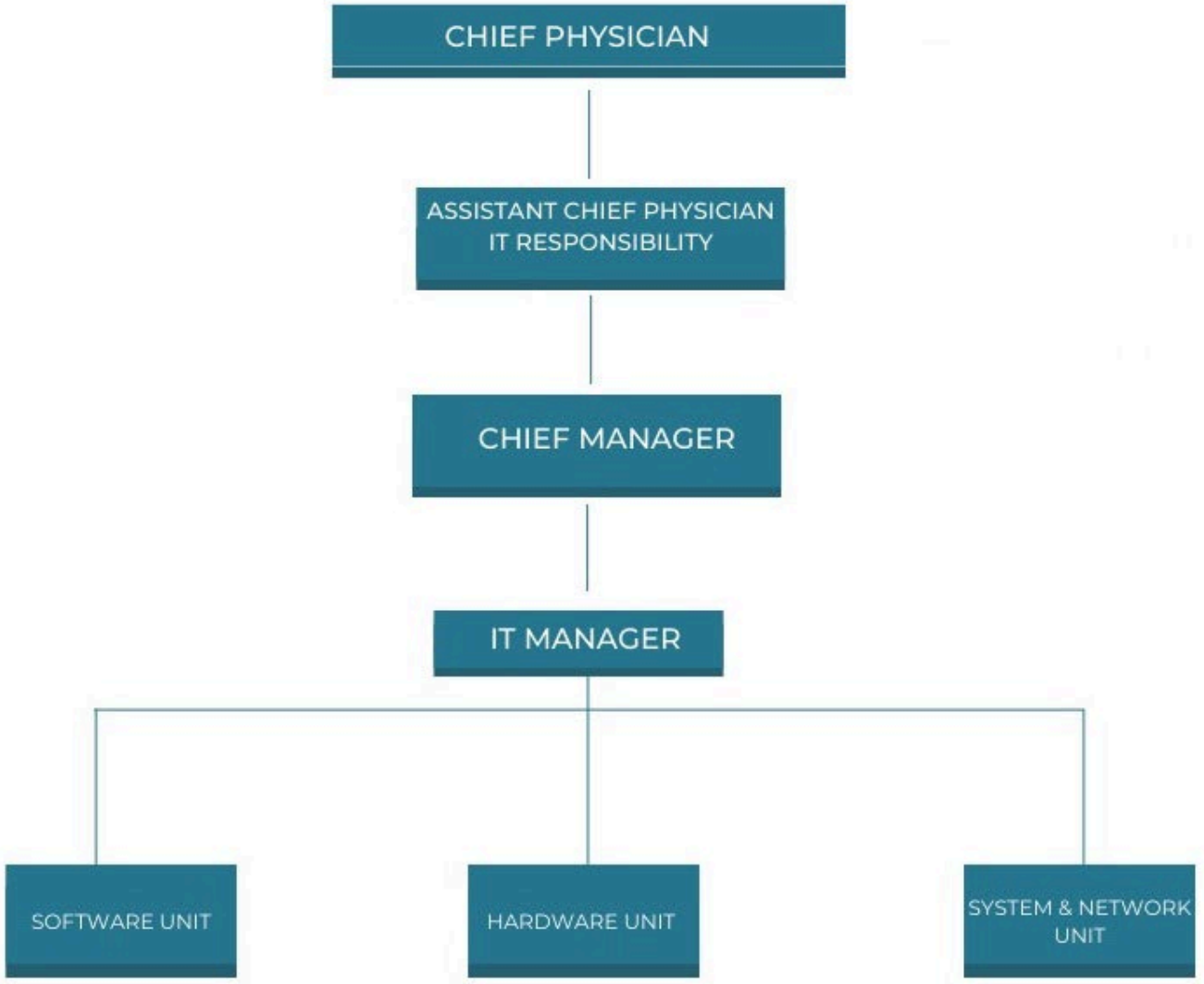
A	INACTIV
B	INDIRECT IMPACT
C	DIRECT IMPACT

IT Responsibilities

IT Department in a hospital is responsible for;

- Keeping all systems running securely and reliably
- Supporting clinicians and administrative workflows
- Protecting sensitive data
- Driving digital transformation

IT DEPARTMENT OF MCBU HSH



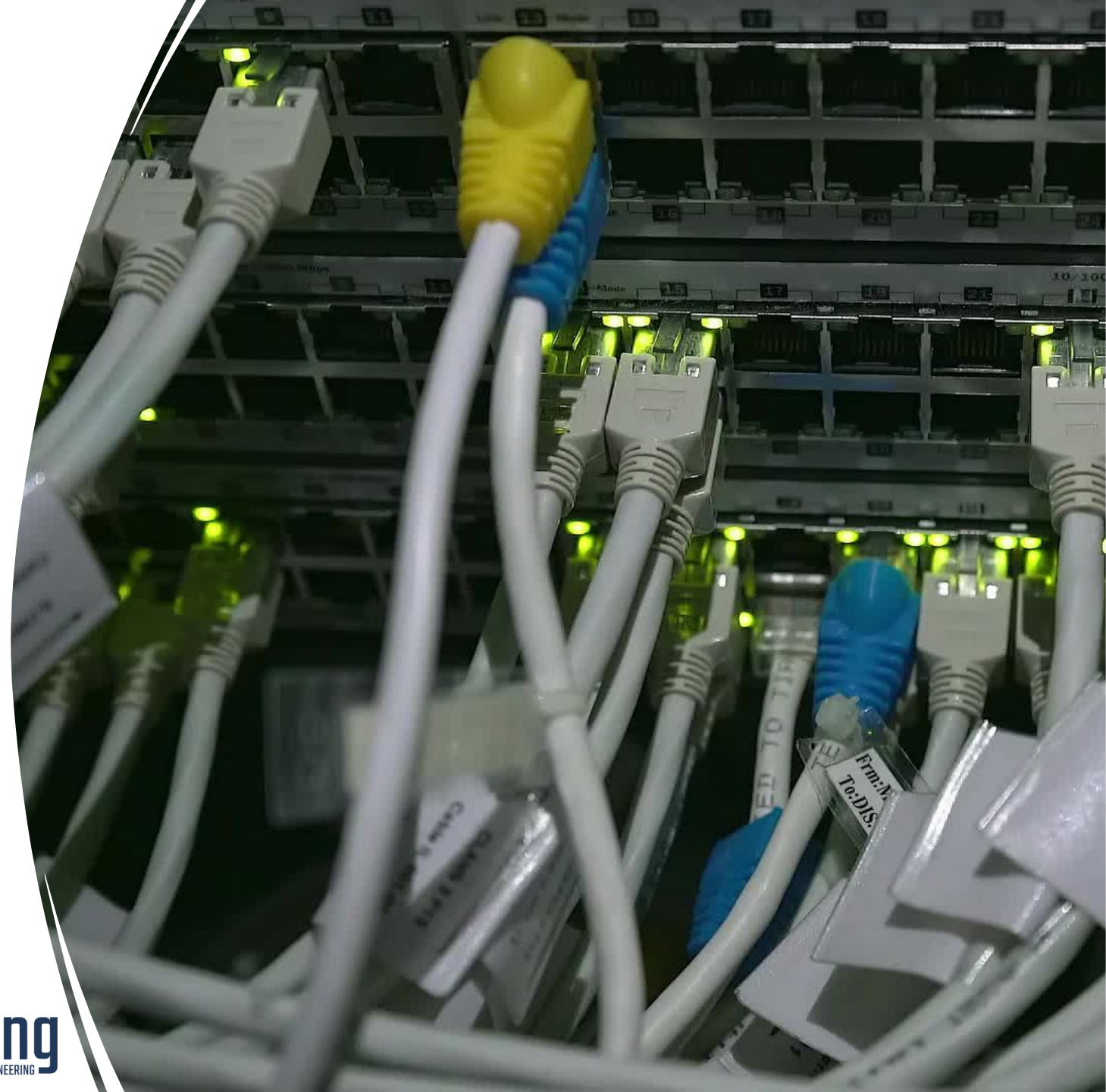
Sub-Units

Software Unit gives support to HIMS. They prepare queries to give some statistics and reports, bug debugging and problem solving. Manages website and LMS

Hardware Unit gives desktop support, they support the PCs, laptops, printers and other devices for hospital.

System & Network Unit

- This unit is responsible for core systems in data center of hospital, security, system and network.
- They are always on call for 24/7. They have to perform system maintenance at the least-busy times of the night and the weekend.



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System & Network Unit

Some responsibilities of this team;

- Server maintenance
- Data center maintenance
- System and network maintenance and upgrades
- Firewall and System Security
- Router and Switch Management
- Integration of Medical Devices

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System & Network Unit

EMAIL AND INSTANT MESSAGING SYSTEMS

TEMPERATURE AND HUMIDITY MONITORING

NURSE CALLING SYSTEM

DOCUMENT MANAGEMENT SOFTWARE

PROGRAMS AND APPLICATIONS THAT DON'T FIT ANYWHERE ELSE

SOFTWARE SUPPORT EXCEPT HIS/ RIS

Hospital Information Management System (HIMS)

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HIMS (Hospital Information Management System)

HIMS is the backbone of hospital digital transformation, improving both patient care and operational efficiency.

HIMS supports modern healthcare through integrated data.

Benefits of HIMS

- Improved patient care quality
- Reduced errors and duplication in processes and information
- Faster and correct billing
- Better resource utilization
- Compliance with regulations
- Data Security

All of these benefits translate into better patient outcomes and higher organizational efficiency.

Elements of HIMS

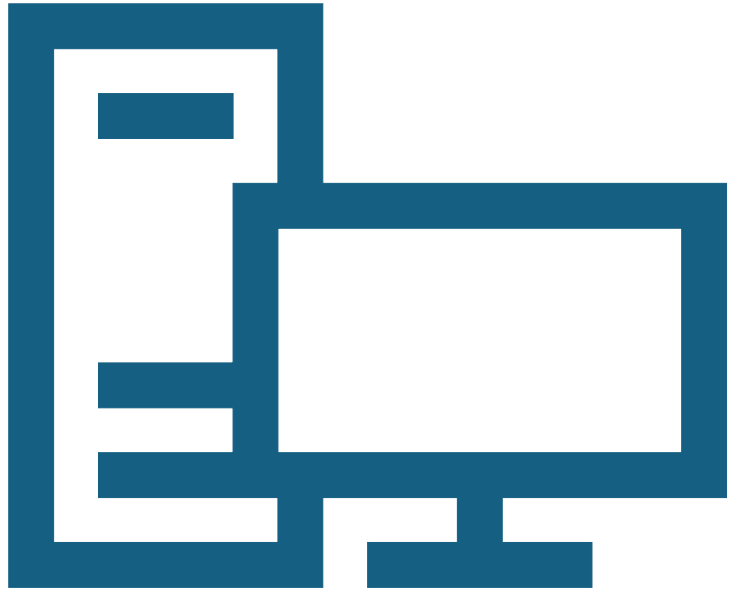
- Software Modules
- Hardware
- Infrastructure and Network
- Data Security and Backup
- Organizational Elements
- Integration

Core Software Modules of HIMS

- Laboratory Information Systems (LIS)
- Radiology Information Systems (RIS)
- Pharmacy Management
- Patient Administration Management
- Electronic Health Records (EHR)
- Finance and Administration Management
- Support Services Management
- Clinical Decision Support Systems

Hardware Components of HIMS

- Servers
- Storage Units (NAS/SAN)
- Network Devices (Switch, Router, Firewall, APs)
- User Terminals (Desktop Computers, Kiosk, Medical Panel PC, Workstation, Tablet)
- Barcode Reader and Printers

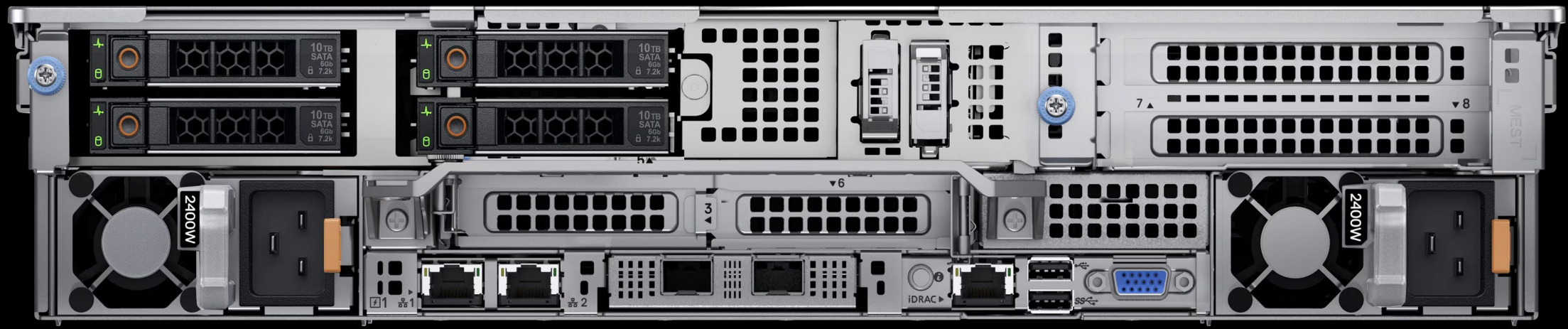


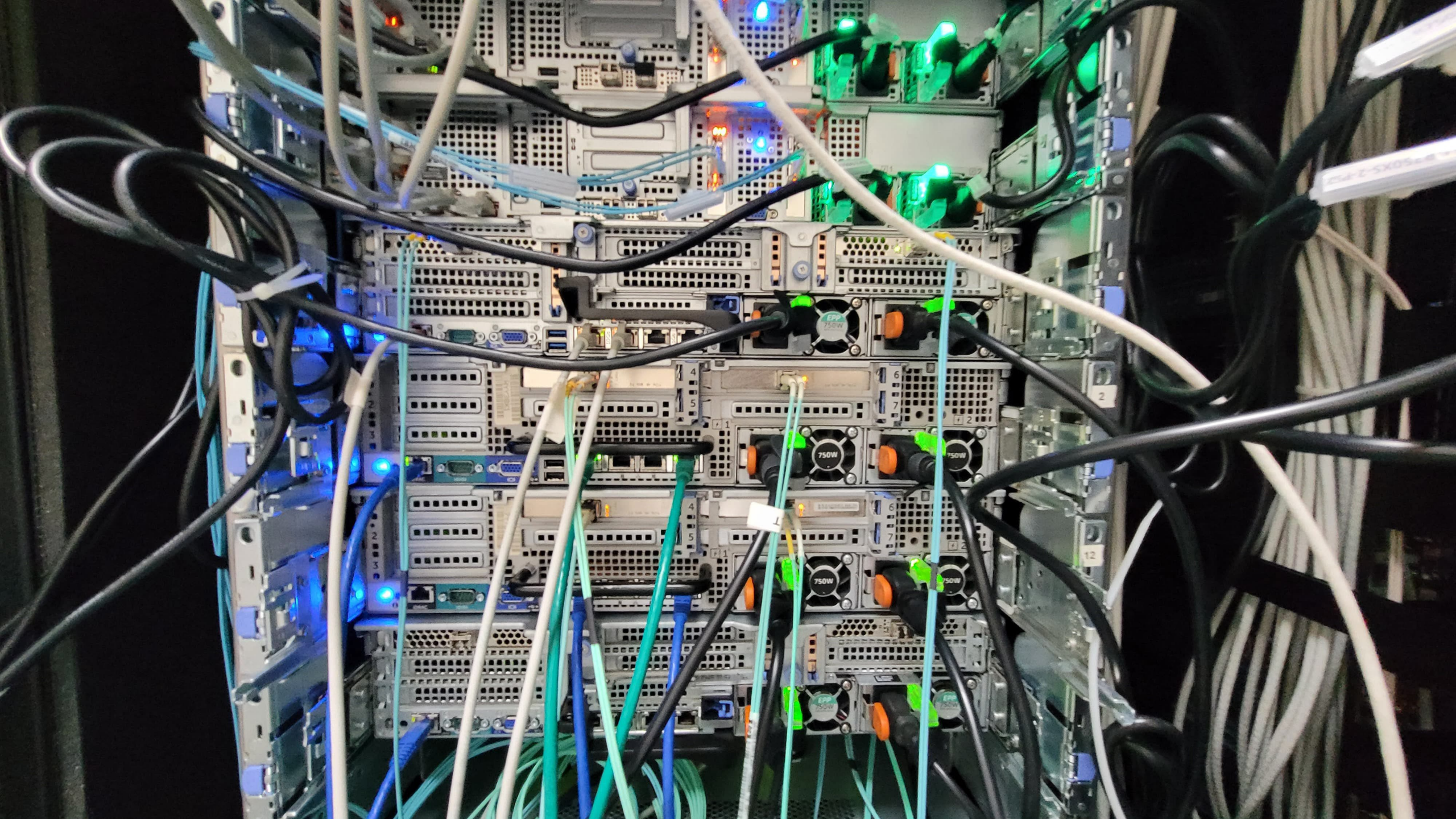
SERVERS

Server hardware is built around principles that ensure high availability, reliability, and performance:

- **Redundancy:** Duplication of critical components (power supplies, RAID drives, network interfaces) so that if one fails, a backup can immediately take over, preventing downtime.
- **Scalability:** The ability to easily add more resources (CPU, RAM, storage) to the server to handle increasing workloads without replacing the entire system.
- **Manageability:** Features like iLO/iDRAC/IPMI allow for remote monitoring, diagnostics, and management of the server, reducing the need for physical presence.
- **Serviceability:** Designed for easy access and replacement of components (hot-swappable drives, PSUs, modular designs) to minimize maintenance time.

10TB SATA 6Gb 7.2k
PowerEdge R760


10TB SATA 6Gb 7.2k
2400W
2400W
iDRAC
1
2
3
6
7
8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